

# NORTHERN LAND USE GUIDELINES

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Applying Sustainable  
Development



Indian and Northern  
Affairs Canada

Affaires indiennes  
et du Nord Canada

Canada





NORTHERN LAND USE GUIDELINES

# Applying Sustainable Development



Indian and Northern  
Affairs Canada

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et du Nord Canada

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durable





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# Preface

The Department of Indian Affairs and Northern Development (DIAND) has revised its popular land use guidelines series. These publications are designed to guide land use activity on Crown land in the Northwest Territories, Nunavut and Yukon. Activities on land under private ownership (e.g., First Nations land)<sup>1</sup> and land under municipal or territorial control (e.g., Commissioner's land) require direction from the appropriate agency.

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## *Guidelines apply to land use activities on Crown land only*

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In the past, incorporating environmental protection into northern development has been considered costly. This series suggests, however, that proper environmental planning can save time and money in the long run. These guidelines will assist proponents and operators in planning proposed land use activities, assessing related environmental effects and minimizing the impacts of these activities.

This series of guidelines should be supplemented by local research, traditional knowledge, engineering or other professional expertise specific to a proposal and advice from the appropriate regulatory agency. Although every attempt has been made during the preparation of these guidelines to use up-to-date information, it remains the operator's responsibility to obtain the most recent information related to northern resource development and to follow current regulatory requirements.

---

*Guidelines are subordinate to all acts, ordinances, regulations and permit terms and conditions*

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Volumes in this series include:



Overview



Administrative Framework



Administrative Process



Applying Sustainable Development



Permafrost



Access: Roads and Trails



Camp and Support Facilities



Pits and Quarries



Mineral Exploration



Hydrocarbon Exploration



Other Land Uses



Abandonment and Reclamation

The series is available electronically at the DIAND Web site: [www.ainc-inac.gc.ca](http://www.ainc-inac.gc.ca)  
Readers are encouraged to visit the site for updates and revisions to the series.

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<sup>1</sup> Applies also to other Aboriginal-owned lands — First Nations, Inuit or Metis.

For further information concerning the subject matter contained in this guideline series, please contact:

## **HEADQUARTERS**

Manager, Land Programs  
Natural Resources and Environment Branch  
Department of Indian Affairs and Northern  
Development  
Les Terrasses de la Chaudière  
10 Wellington Street  
Hull QC K1A 0H4  
Tel.: (819) 994-7464 Fax: (819) 997-9623  
E-mail: NorthernLands@ainc-inac.gc.ca

## **NORTHWEST TERRITORIES**

Land Administration  
Northern Affairs Program  
Department of Indian Affairs and Northern  
Development  
P.O. Box 1500  
Yellowknife NT X1A 2R3  
Tel.: (867) 669-2673 Fax: (867) 669-2713  
E-mail: NWTLands@ainc-inac.gc.ca

## **NUNAVUT**

Land Administration  
Department of Indian Affairs and Northern  
Development  
P.O. Box 100  
Iqaluit NU X0A 0H0  
Tel.: (867) 975-4275 Fax: (867) 975-4286  
E-mail: landsmining@ainc-inac.gc.ca

## **YUKON**

Land Use Section  
Land Resources  
Department of Indian Affairs and Northern  
Development  
345-300 Main Street  
Whitehorse YT Y1A 2B5  
Tel.: (867) 667-3173 Fax: (867) 667-3214



# Acknowledgements


In the 1980s, Indian and Northern Affairs Canada published a series of six land use guidelines, in a handbook format, intended to help operators of small to medium-scale projects carry out activities in northern Canada in an environmentally sensitive manner. These handbooks, commonly called "The Blue Books," have been widely distributed and quoted; they have been reprinted several times and are still requested. Their success is a tribute to the efforts of the original authors and contributors and to the departmental steering committee that guided their preparation.

This new series of northern land use guidelines is, in part, an update of the earlier series. This work was directed by a steering committee that included the following Northern Affairs Program staff: Robert Gowan (Headquarters), Stephen Traynor (Northwest Territories Region, then Nunavut Region), Buddy Williams (Northwest Territories Region), Mark Zrum, then Marg White (Yukon Region) and Carl McLean (Nunavut Region).

Much of the information presented in this series was obtained through discussions with

land use administrators and resource management officers in the Northwest Territories, Nunavut and Yukon. These people are thanked for their time and assistance. To the many individuals who provided photographs for inclusion in this series, thank you. In addition, thanks are extended to the many operators and consultants who took the time to discuss their varied experiences as they relate to land use in northern Canada.

The initial text for the current series was drafted by Komex International Ltd., Calgary, Alberta (with the assistance of David Loeks of TransNorthern Consulting, Whitehorse, for the volume *Applying Sustainable Development*). The efforts of Komex staff and consultants are acknowledged. The series was edited by Robert Drysdale, Ottawa, whose attention to detail is most appreciated. Icons representing the new volumes were created by Venture Communications, Ottawa, and the cover and publication layout were designed by Blackbird Publications, Communication and Design, also of Ottawa.



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# CHAPTER 1

## Introduction

The Government of Canada has committed to the concept of sustainable development as a means of protecting natural resources, the environment and Canadians.<sup>2</sup> This commitment has been legislated into the *Auditor General Act*.

The Department of Indian Affairs and Northern Development (DIAND) has submitted its sustainable development strategy to the House of Commons. The intent of this strategy is to describe how the department will integrate sustainable development into its policies and programs.

As part of its commitment toward sustainable development, the department supports the following ideas:

- sustainable development continually addresses cultural, social, economic and environmental concerns;
- development creates opportunities, prosperity and choices for all northern peoples; and
- development must proceed in a manner that leaves choices for future generations.<sup>3</sup>

For proponents, the benefits expected from integrating sustainable development principles and practices into land use activities include:

- better project definition;
- better project planning;
- public support for development;
- faster approval and construction;
- reduced environmental risk; and
- improved return on investment.



*A planned development.*

### 1.1 Purpose

This volume describes how principles and practices of sustainable development benefit resource development in northern Canada. The intent is to help proponents understand how sustainable development affects proposed land use activity. As for other volumes in this series, these guidelines apply to Crown land within the Northwest Territories, Nunavut and Yukon. The ideas presented, however, may have broader application than the Crown lands within these areas.

<sup>2</sup> Government of Canada. *A Guide to Green Government*. Ottawa: Minister of Supply and Services, 1995.

<sup>3</sup> DIAND. 1997a. *Towards Sustainable Development*, p. 9.



## CHAPTER 2

# Sustainable Development in the North

**A**cross northern Canada, citizens and regulators have expressed concerns over environmental degradation as a result of land use activities. Environmental degradation ranges from temporary disturbances, such as a portable seismic camp, to long-term disturbances, such as mining operations.

Northern Canada has unique environmental features that warrant attention. Any activities that disturb these features can leave long-lasting effects. For example, disrupting the active layer in permafrost can alter watercourses, slopes, soils and vegetation. Impacts such as these may affect wildlife habitat, access roads and the integrity of buildings. Scarring of the landscape and loss of land productivity results.

---

### *Development activities can leave long-lasting effects*

---

Northern communities are tied to the land. The land provides livelihood, “country foods” and a sense of place. The proponents of land use activities must recognize this relationship between northern people and the land.



*A community in Nunavut.*

---

### *Development activities can have direct and indirect impacts on the environment, economy and society*

---

Poor development practices may lead to negative impacts on community and ecosystem well-being. Public concern over the effects of development suggests that changes are necessary in how proponents plan and implement projects.

---

### *Plan for the full life of the activity*

---

## 2.1 What is Sustainable Development?

DIAND has adopted the “Brundtland” definition of sustainable development:

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.<sup>4</sup>

Sustainable forms of development will address environmental, societal and economic needs. In other words, sustainable development brings together economic development, social equity and environmental quality.<sup>5</sup>

Sustainable development requires that we protect and maintain “essential ecological processes, biological diversity and life support systems of our environment and natural resources.”<sup>6</sup>

---

<sup>4</sup> World Commission on Environment and Development (WCED). 1987. *Our Common Future*.

<sup>5</sup> DIAND. 1997a. *Towards Sustainable Development*, p. 9.

<sup>6</sup> Conklin et al. 1991. *Sustainable Development*, p. 7.

Sustainable development accepts that a healthy economy needs both a healthy environment and a healthy society. It encourages development that minimizes unacceptable environmental and social impacts. So how can this be accomplished?

---

*Advancing sustainable development requires planning for the entire life of the project, from project planning to construction through to project closure*

---

When planning a project, proponents need to consider technical, economic, social and environmental aspects. Through planning, proponents can identify potential concerns that affect the project. At the planning stage, proponents have a broader range of options to choose from to address concerns. For example, planning to avoid sensitive terrain may reduce construction, operating and reclamation costs. Cost reductions would result from improved construction techniques and the reduced need for and delivery of specialized equipment.

Sustainable development ensures that resources needed by current and future generations will be available and still valuable. Sustainable development promotes continuation of benefits from development activities over the long term.

---

*Applying the principles of sustainable development ensures that resources needed by current and future generations will be available and still valuable*

---

## 2.2 Why Consider the Long Term?

Prudent proponents in northern Canada plan for the long term. Identifying project needs in advance of starting construction or operations saves time and money and reduces frustration.

Developing and operating projects in the North can be expensive because of the

- long distances to markets;
- limited physical infrastructure;
- diverse legislative, regulatory and fiscal framework;
- thorough environmental assessment process;
- incomplete information base for the surface geology of the North;
- harsh operating conditions; and
- diverse needs of northern communities.<sup>7</sup>

Proponents in northern Canada need to consider sustainable development at the project planning stage to avoid potential negative impacts on the environment and society. By committing to sustainable development over the life cycle of the project, proponents can realize significant benefits:

- avoidance of costly delays due to public opposition to project approval;
- more efficient use of resources, time and capital;
- improved environmental performance during operation;
- lower operating costs;
- reduced costs for abatement equipment, clean-up and disposal;
- reduced risk of legal or financial liability; and
- better return on investment.

<sup>7</sup> DIAND. 1997a. *Towards Sustainable Development*, p. 40.

---

*By committing to  
sustainable development,  
proponents benefit over  
the project life cycle*

---

As scientific understanding of the environment, technical knowledge and industries' best practices evolve, so too will the principles and practices of sustainable development. Commitment by industry is essential if the concept of sustainable development is to mature.

---

*Industry commitment  
is essential to advance  
sustainable development*

---

## **2.3 One Industry's Commitment to Sustainable Development**

An example of commitment to sustainable development has come forward from the mining sector in partnership with the federal government.

*The Minerals and Metals Policy of the Government of Canada: Partnerships for Sustainable Development* (1996) applies sustainable development to minerals and metals by

- finding, extracting, producing, adding value to, using, reusing, recycling, and, when necessary, disposing of mineral and metal products in the most efficient, competitive, and environmentally responsible manner possible, using best practices;
- respecting the needs and values of all resource users, and considering those needs and values in government decision making;
- maintaining or enhancing the quality of life and the environment for present and future generations; and
- securing the involvement and participation of stakeholders, individuals, and communities in decision making.<sup>8</sup>

The policy goes on to state that:

In defining sustainable development in the context of minerals and metals, it is recognized that the economic and social benefits of mineral development are not all consumed by the present generation. Current investments in human and physical capital benefit future as well as present generations.<sup>9</sup>



*Modern mining practices (diamond mine).*

<sup>8</sup> Minerals and Metals Sector, Natural Resources Canada. 1996. *The Minerals and Metals Policy of the Government of Canada*, p. 4–5.

<sup>9</sup> *Ibid.*, p. 5.



# CHAPTER 3

## DIAND and Sustainable Development

DIAND is required by federal law to promote sustainable development. (For more information, consult the *Administrative Framework* volume of this series.) Its strategy to implement sustainable development is described in *Towards Sustainable Development*, Volume I.<sup>10</sup> (DIAND documents can be obtained from the department's offices or from its Web site at [www.ainc-inac.gc.ca](http://www.ainc-inac.gc.ca)). As this strategy will be updated every three years, dialogue among DIAND, First Nations and other northern peoples will continue.<sup>11</sup>

### 3.1 DIAND's Strategy

DIAND's sustainable development strategy encourages a "common understanding and approach to sustainable development."<sup>12</sup> DIAND has focussed this concept by adopting a set of guiding principles that serve as indicators of progress toward sustainable development.

### 3.2 Sustainable Development Principles

As stated in DIAND's sustainable development strategy:

DIAND's commitment is to support sustainable development with First Nations and northern peoples. Given DIAND's dual mandate to act responsibly with respect to protecting the environment and to supporting development, a unique opportunity exists to support sustainable development. The Department's own understanding of sustainable development is growing.<sup>13</sup>

All land use activities governed by DIAND will be guided by the following principles of sustainable development:

- open, inclusive and accountable decision making;
- honouring treaty and fiduciary obligations;

- consideration of economic viability, culture and environmental values as policies and programs are developed;
- provision of fair and equitable opportunities for First Nations and northern peoples;
- consideration of sharing risks and benefits of development;
- respect for diverse cultures and traditional values;
- respect for the land and its diversity as the foundation for healthy communities;
- consideration of transboundary and cumulative impacts in decision making;
- efficient use of natural resources and minimization of pollution; and
- fiscal responsibility.<sup>14</sup>

These principles of sustainable development provide direction for development on Crown land in northern Canada.

Common themes implicit in these principles are that

- economic activities must respect ecological limits and societal values, and
- sustainable development relies upon a healthy environment and a healthy economy.

### Open, Inclusive and Accountable Decision Making

Proponents should initiate dialogue with affected parties as early as possible in the planning process to identify concerns, address issues and allow for mitigation or alternative approaches. Addressing potential community concerns regarding development activities can minimize costly delays or denied permits for the proponent and improve the viability of a project.

<sup>10</sup> DIAND. 1997a. *Towards Sustainable Development*, p. i.

<sup>11</sup> First Nations and northern peoples refer to northerners and Aboriginal people, Inuit and Metis throughout Canada.

<sup>12</sup> DIAND. 1997a. *Towards Sustainable Development*, p. 20.

<sup>13</sup> DIAND. 1997a. *Towards Sustainable Development*, p. 9.

<sup>14</sup> DIAND. 1997a. *Towards Sustainable Development*, p. 9.

---

*Initiate dialogue early  
with potentially affected parties*

---

### **Treaty and Fiduciary Obligations**

The federal government is required to uphold past and present obligations to First Nations in northern Canada. These obligations are expressed in various documents: Canada's Constitution, treaty documents (especially Treaty 11), numerous land-claim agreements and recent Supreme Court of Canada decisions.

---

*See Administrative Framework  
volume for additional discussion of  
treaty and fiduciary obligations*

---

### **Economic Viability, Culture and Environmental Values**

Integrated approaches consider all aspects of a proposal before the permit application stage. Ongoing awareness of economic viability, culture and environmental values throughout a project's life cycle will strengthen the project.

### **Fair and Equitable Opportunities**

This principle addresses how the benefits and costs of land use activities are distributed. For example, project proponents should ensure that local communities profit through job creation, supply of materials and services, and other direct benefits.

### **Sharing Risks and Benefits of Development**

The distribution of risks and benefits has two dimensions: among affected parties and over time (among affected generations). In the first case, where potential risks are apparent for other land users, potential benefits should also be shared among those users. In the second case, proponents need to ensure that long-term benefits match or exceed any long-term negative effects of present development activities. In

other words, the risks assumed by later generations need to be tied to a compensating stream of benefits.

### **Respect for Diverse Cultures and Traditional Values**

The northern traditional way of life should be respected during development activities. Wherever possible, proponents should consider, acknowledge and apply traditional knowledge as provided by area residents.

### **Respect for the Land and its Diversity**

The northern landscape varies from tundra to mountains, from rocky coastlines to mature forest. This diversity requires that proponents gather information on, and gain a thorough understanding of, specific sites.

### **Transboundary and Cumulative Impacts**

Transboundary effects refer to development activities in one geographic location that impact another geographic location.

Cumulative effects refer to effects that are likely to result from one project in combination with other projects or activities that have been or will be carried out.<sup>15</sup> As measuring, predicting and monitoring these cumulative changes may be difficult and expensive, a better strategy is to avoid them through consultation, expert advice and proper planning.

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*Impacts may be avoided through  
consultation, expert advice and  
proper planning*

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<sup>15</sup> Canadian International Development Agency. *Handbook on Environmental Assessment of Non-governmental Organizations and Institutions Programs and Projects*. Ottawa: Minister of Public Works and Government Services Canada, 1997, p. 21.

### **Efficient Use of Natural Resources and Minimization of Pollution**

Sustainable development is good business. Conservation of energy, recycling of products, efficient use of materials, reduction of waste, and tracking of costs and benefits all lead to more effective project management and a more viable project.

### **Fiscal Responsibility**

This principle places a high priority on full life cycle costing in determining project feasibility. Life cycle analysis should be undertaken for all proposed land use activities, and full cost accounting applied, to ensure that all human and ecological costs are considered and the most sustainable solutions are found. This approach can help avoid activities that may provide only short-term benefits but result in long-term costs for monitoring and clean-up.

### **Summary**

Each development activity will require specific application of the principles of sustainable development. In some settings, particular principles may play a stronger role than others. Each project, however, is unique and should receive the attention to detail and expertise needed to respond to its unique circumstances.



# CHAPTER 4

## A Life Cycle Approach

A life cycle approach to sustainable development applies to all phases and components of land use activity. This chapter outlines the four phases of a typical development.

Phase 1: Planning and design

Phase 2: Project construction

Phase 3: Use and operation

Phase 4: Abandonment and reclamation

Questions are asked to assist the proponent in applying sustainable development before, during and after development activities. Through early identification of potential issues, proponents can avoid or reduce adverse social and environmental impacts.

### 4.1 Phase 1: Planning and Design

#### Considerations

The following points, among others, should be considered during the project planning and design phase:

- What needs will the development be meeting?
- What development option best suits the needs of the proponent, nearby communities and other affected parties?
- What scale of development is required and in what time frame?
- Will there be significant impacts resulting from development activities? How can impacts be minimized or mitigated?
- Will there be community concerns that need to be addressed? What are the anticipated concerns?
- Will this project produce direct or indirect impacts that will adversely affect the environment? For example, will the environment be able to regenerate resources and absorb waste in a timely fashion? Will this development reduce choices for future generations?
- What will be the costs and benefits for the local community? Will the benefits outweigh the costs?

- When should development begin and end?
- Will there be a single use, multiple uses or phased uses of the development/site?
- How will the area likely develop in the future?
- What regulatory requirements need to be met at each stage of development?
- What design and construction techniques should be considered now to more easily and successfully achieve project closure?
- How will future use of this site be affected by this development?
- What future uses of the site and surrounding area are possible?
- Can abandonment and reclamation be achieved successfully based on current knowledge?

#### Gather Information and Consult Parties

Gather background information about the area proposed for development. Find out if opportunities or problems exist that might affect the project. As soon as possible, inform anyone who may be affected by the project. Develop an awareness of the area and be willing to respond to the needs of those potentially affected by the development. Early communication with regulators and other affected parties will assist in identifying issues that need to be addressed in the development plans.

#### Analyze Information

Based on the information gathered, decide if the project should proceed, if you need additional information or if components of the project should be re-examined.

#### Examine Project Options

Identify which development options might meet project needs. Weigh the best options by considering the purpose and scale of the project.

Issues to consider include potential environmental impacts, interests of affected parties, project requirements, engineering requirements, long-term use of the site and cost.

Outline a plan for site development, operation and closure. This plan will be useful for permit application and later steps.



*Access road under construction.*

### **Select Site**

Usually a proposed site is identified in the permit application. This site may need to be relocated somewhat as the project proceeds. The location may be changed based on more detailed information about the environment, cost and interests of affected parties.

Depending on permit terms, consultation with potentially affected parties may be required concerning sensitive features, timing of construction, materials and other matters. Even when not required, consultation helps improve the viability of a proposed project.

### **Refine Project**

As the planning process proceeds, changes to the project may be necessary. Approaches to minimize and avoid potential impacts need to be developed and reviewed. An environmental management system that includes sound land use guidelines should be incorporated into the project plans. These guidelines should be developed using qualified experts, local research and traditional knowledge as appropriate.

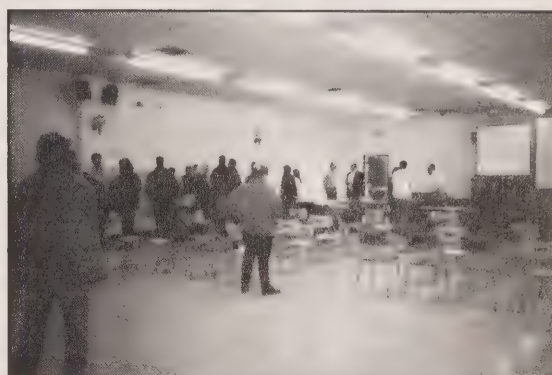
### **Apply for Permit**

Identify all permit requirements for the project. Prepare and apply for those needed to initiate the project. Consider the permit review and approval process and develop the project schedule accordingly. The proponent is responsible for obeying all laws as they apply to the design, construction, operation and closure of the project.

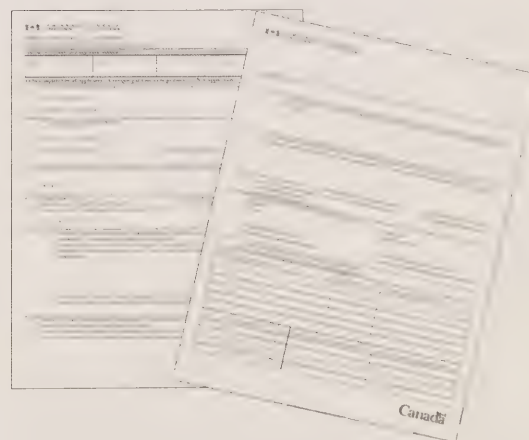
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*Understand laws that apply to the design, construction, operation and closure of the project*

---



*Public consultation with affected parties builds co-operation and helps realize mutual benefits.*



*Permit application.*

## 4.2 Phase 2: Project Construction

### Considerations

Based on the principles of sustainable development, the following points should be considered before and during project construction:

- Have environmental and social considerations, as well as technical, engineering and economic aspects, been included in the planning and construction phases?
- If special features, such as archaeological sites, sensitive wildlife habitat or unique geological features, are located at or near the development site, how will they be protected?
- Have emergency response plans been developed? Are employees aware of procedures? Are they properly trained? Is response equipment in place?
- Have all permit requirements been met?
- Are other land uses affected by the development activities? Are there ways to minimize disruptions such as noise?
- Do development activities need to stop during critical time periods (e.g., under certain weather conditions, during wildlife migration, during calving season)?
- Will special equipment be required? Will it be available when needed?
- Will a monitoring program be needed to document environmental effects and their significance? How will environmental aspects associated with the construction phase be monitored?
- Have proper waste handling practices been established? Is the necessary equipment available (e.g., secondary containment structures, if necessary)?
- Will hazardous waste or materials be used or produced during the construction phase? How will these materials be handled, stored and disposed of?

- Can development activities be sited on previously disturbed lands?
- How will nearby watercourses be protected?
- Could development activities affect natural drainage courses, permafrost or soil stability?
- How will impacts to the aesthetics of the area be minimized?
- Does existing infrastructure (roads, utilities, etc.) have the capacity for additional development?
- Is construction consistent with abandonment plans?

### Plan Construction

Develop detailed engineering and construction plans as required. Preparation of such plans typically requires qualified technical and engineering expertise. These plans should address the specific environmental and construction issues identified during Phase 1.

Operating and maintenance procedures must also be addressed in adequate detail at this time.

### Site Assessment

The site should be properly identified and assessed before construction begins. For example, vegetation, drainage, erosion control, wildlife habitat, archaeological sites, noise, health/safety of workers and neighbours, waste management and adjacent land uses all need to be considered.



*Site assessment.*



### Commence Construction

Specific activities will vary according to the project's purpose and objective, terrain conditions, local weather conditions and permit requirements. The proponent is responsible for ensuring that all permit requirements are met during and following the construction phase. For example, the permit may specify that use of the development may not begin until operating approvals have been granted. Inspections by regulators are likely to take place during and following the construction period.

### 4.3 Phase 3: Use and Operation

Long-term use, maintenance and management plans should be developed before the project is actually constructed. It is the proponent's responsibility to ensure that these plans are implemented.

Sound maintenance programs and regular inspections of projects in the North are critical for environmental, safety and economic reasons.

---

*Proponents are responsible for developing and implementing long-term use, maintenance and management plans*

---

### Operational Considerations

The following points should be considered before and during project operation:

- Will increased access to the development location affect the environment?
- How will environmental impacts not anticipated during project planning be monitored, identified and addressed?
- Will pollutants be generated during operations? How will they be monitored and mitigated?
- What will be the costs and benefits for nearby communities?

- Will there be added or reduced pressure on natural resources? How will this pressure be addressed?
- Are some impacts occurring repeatedly? How can procedures or practices be altered to reduce the severity and occurrence of such adverse effects?

### Implement Maintenance Programs

Preventative maintenance programs reduce negative environmental and social effects and project costs. In conjunction with such programs, establishing a general and flexible maintenance plan before project start-up will allow for maintenance on an as-needed basis.

### Monitor the Project

A regular monitoring program will help identify potential problem areas early. Generally, resolving a problem at an early stage is significantly more cost effective than trying to fix the problem once it has reached the impact stage.

### Identify and Correct Problem Areas

Any problems identified during operation, maintenance or inspection of the project should be recorded and addressed/corrected. If problems recur, it may be necessary to return to the design stage to determine if there is a better, lower maintenance solution.

### 4.4 Phase 4: Abandonment and Reclamation

#### Considerations

The following points should be considered before and during project abandonment and reclamation:

- What are the objectives or final end points of the reclamation program?
- Is the original abandonment and reclamation plan still valid?
- What provisions have been made to fund reclamation activities?

- How successful has reclamation been to date?
- Is contamination present?
- Have waste materials been properly handled?
- How long will reclamation activities be required until program objectives are met?
- Have abandonment and reclamation requirements been met?
- How will the reclamation program be monitored?

By thoroughly thinking through and planning development activities before construction begins, unnecessary hurdles may be avoided during the abandonment and reclamation phase. Potential environmental and social concerns are more easily addressed through avoidance, minimization or mitigation. It is possible to carry out development activities in a profitable manner that also addresses environmental and social aspects.

## Planning

Project proponents are responsible for abandonment of project facilities and successful reclamation of the site.

It may be necessary to submit abandonment plans before a Land Use Permit will be issued. By considering abandonment and reclamation from the project's conception, this phase can be much more effective and cost efficient.

## Activities

Abandonment and reclamation activities will vary according to site location and the land manager's requirements. These activities should be carried out during the appropriate season and in the proper sequence. Inspection, approval and closure of the site will depend upon diligent effort at this stage.



*Abandonment and reclamation activities will return the site to a productive state.*

# CHAPTER 5

## Implementation Considerations

In undertaking land use activities in northern landscapes, proponents are often faced with complex technical tasks. As a result, some regulatory requirements and planning aspects may receive less attention than they warrant. Before spending large amounts of money on necessary technical studies, proponents should consider the following general questions:

- Are there any laws, land use plans or land use policies that would automatically result in project refusal?
- Does the law or industry standard for this land area or resource base require consultation or negotiation with First Nations? How will benefit agreements, if applicable, be reached?
- Does the community have concerns that will delay or prevent the approval of a proposed project?
- What are the industry's standard practices for this type of proposed activity and what are the industry's best practices?
- Is the technology for reclamation readily available? How long must reclamation activity be managed after operations have ceased? What is the expected cost?

Addressing these questions before undertaking detailed studies may result in substantial savings.

### 5.1 Preliminary Project Proposal

By considering what major hurdles are likely to be encountered, proponents can save significant effort as the project proceeds. By preparing a preliminary proposal for public review, major hurdles will become more apparent. Working closely with regulators, community groups and other affected parties typically results in better project definition, better project support and increased savings.

### 5.2 Community Consultation

Unique community needs cannot be addressed in a generic national strategy. And, because the community is at the heart of decision-making, a community-based approach is key to sustainable development.<sup>16</sup>

In northern Canada, communities are very close knit. Individuals often serve in several leadership roles. One northern expression suggests that “there are no secrets north of 60.” To avoid misinformation, proponents must provide very clear information in a format appropriate to the audience.

Gaining community support goes beyond meeting with a municipal or band council. An ongoing forum for sharing information, ideas and concerns is needed to ensure that the purpose of the proposal (and of the dialogue) is clear. Proponents need to address a wide range of objectives in response to a variety of decision makers, affected parties and interests.

### 5.3 First Nations

First Nations now have substantial decision-making authority. For example, certain land-claim agreements may require that benefit agreements with First Nations be negotiated as part of the development process.

In understanding that traditional knowledge may influence proposal design, proponents must determine how best to gain this knowledge. By building this time into the project schedule, the timing of other activities may be delayed. Understanding and accepting these requirements will reduce the potential for frustration and miscommunication at a later, more essential stage.

<sup>16</sup> DIAND. 1997a. *Towards Sustainable Development*, p. 23. Public participation is also a key objective of the *Canadian Environmental Assessment Act* (S.C. 1992, c. 37). Provisions have been made within this Act for the public to become involved in screening reports, comprehensive studies, mediation and panel reviews.



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*Understanding traditional knowledge requirements at the onset will reduce potential miscommunication at later stages*

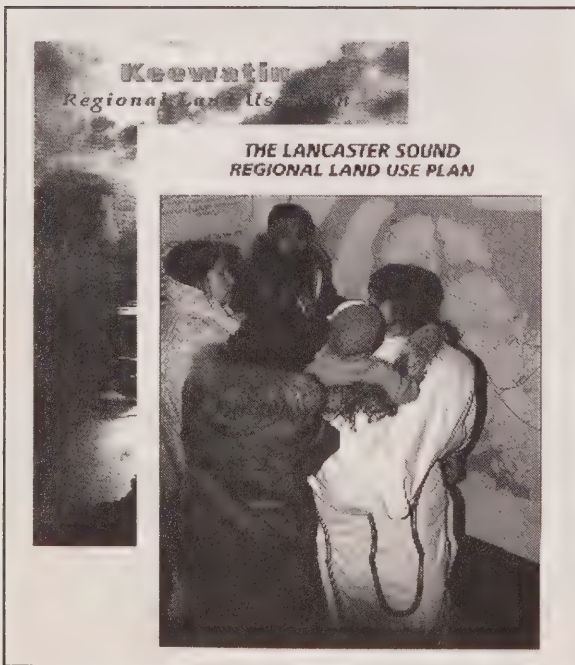
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## 5.4 Land Use Planning

An approved land use plan will provide an initial set of goals, objectives and guidelines (hopefully with some spatial definition) against which project activities can be compared.

When plans are under way but not approved, the planning process provides proponents with ready access to a wealth of relevant information on

- resource features, such as critical habitat areas;
- First Nations special management areas;
- proposed wilderness, park and recreation areas;
- land status maps; and
- proposed zoning.



*Regional land use plans.*

## 5.5 Environmental Impact Assessment

In many cases, proponents are required by law to conduct an environmental impact assessment for all components of potential projects before commencing development. The purpose of the assessment is to identify environmental effects of development activities and determine the significance of these effects. Following the assessment, mitigation measures may be proposed that will be implemented to reduce or avoid impacts. Development of monitoring programs is also part of the assessment.

Environmental impact assessments are often expensive. The initial (“scoping”) phase typically highlights issues that require attention. Splitting the scoping phase, and allowing longer review time on the range of issues, may provide the proponent with a higher degree of confidence that the most significant issues will have been identified before proceeding with the full assessment.

## 5.6 Cumulative Effects Monitoring

Cumulative effects are “effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out.”<sup>17</sup> Certain federal laws require that proponents assess the full spectrum of cumulative effects as part of the project’s environmental impact assessment.

Gaining an understanding of other existing and proposed projects, and their effects, will give proponents a broader perspective. This insight may result in alteration of the project proposal, as well as the proponent’s intended operational practices.

<sup>17</sup> Canadian International Development Agency. *Handbook on Environmental Assessment of Non-governmental Organizations and Institutions Programs and Projects*. Ottawa: Minister of Public Works and Government Services, 1997, p. 21.

## 5.7 Best Practices

Understanding current standards practised by industry will assist with project design. Best practices refer to those life cycle methods (planning, construction, operation and abandonment) that go beyond regulatory requirements and industry norms. Project comparison is a common assessment method followed by regulators and communities. By demonstrating that the full life cycle of benefits and effects has been considered, proponents are more likely to be successful in their efforts to convince regulators and communities that their project will be of benefit to the region.

## 5.8 Reclamation Practices

Current practices typically require a security deposit, or contingency fund, if a project has any likelihood of being abandoned (without reclamation) by a bankrupt operator. Ongoing reclamation efforts are also encouraged as a means of avoiding “orphaned” sites.

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# APPENDIX

## A Case Example

### Overview

Brewery Creek is a hardrock gold mine located on the North Klondike River near Dawson City, Yukon. It is Yukon's most significant resource-development start-up since the land-claims settlement reached with Yukon First Nations. Subject to a rigorous environmental review requiring comprehensive life cycle planning, Brewery Creek cleared the assessment and permitting processes in 18 months and began processing in the fall of 1996.

### Sustainable Development Guides the Environmental Review Process

The Department of Indian Affairs and Northern Development's mandate is to support development while protecting the environment. DIAND accepts that development is needed to create opportunities, prosperity and choices for First Nations and northern peoples, but that it must proceed in a manner that leaves choices for future generations. Guided by sustainable development principles, the environmental review and permitting processes are means by which DIAND carries out its mandate.

The Brewery Creek project proposed the first use of heap leach ore processing in northern Canada. Heap leaching separates gold by dissolving it with a dilute cyanide solution. Run-of-mine ore is placed on a prepared leach pad in 10-metre high lifts. A dilute cyanide solution is dripped onto the ore by means of buried irrigation drip lines. A plastic liner system at the base of the leach pad collects the leach solution and directs it to a plant where the gold is recovered. A second plastic liner sits under the first liner to collect any leakage and to prevent solution from escaping from the system.

Although this technology was well-established in western United States, the public and DIAND staff were concerned about how it would perform under sub-arctic conditions as the technology was viewed as risky.

The environmental review process enabled the proponent, public and government authorities to identify and address all concerns before committing to the project. Through detailed life cycle planning, the proponent showed how environmental and social impacts would be avoided or mitigated, how benefits of the project would be shared, and how the company would fulfill its long-term responsibilities after the mine ceased to operate. The thoroughness and attitude of the proponent during the review process were critical to the success of the proposal.



*Information sessions on Brewery Creek Mine.*

It took a competent operator, diligent engineers and good faith to take the project through the permitting process. The Brewery Creek Mine could have stalled on any number of issues:

- technical design details;
- effectiveness of mitigation measures;
- completeness of baseline environmental descriptions;
- adequacy of local consultation; or
- suitability of restoration plans.

The project's success illustrates how the sustainable development principles recognized by DIAND can best be applied. Careful consideration of these principles will facilitate the permit application process. For the

proponent, some of the benefits of the contemporary review approach are

- producing a technically and environmentally sound design;
- reducing the likelihood of local opposition;
- reducing the risks of long-term liability; and
- reducing real costs over the life cycle of the project.

## Implementation Considerations

Like most developments in the North, the Brewery Creek project faced three fundamental questions at the heart of sustainable development:

- Given the location, are likely environmental impacts acceptable and are risks of catastrophic impacts low enough?
- Are anticipated benefits to the community sufficient to justify environmental impacts and risks?
- Can and will a reclamation plan be successfully implemented?

By applying a life cycle approach to the principles of sustainable development, Brewery Creek project proponents worked with local communities and regulators to meet their respective interests, to allay concerns, and to build a profitable, environmentally acceptable mine.

## Life Cycle Approach

A life cycle approach was applied to the four phases of the project's development:

Phase 1: Planning and design

Phase 2: Project construction

Phase 3: Use and operation

Phase 4: Abandonment and reclamation

## Planning and Design

Brewery Creek proponents began the review process by submitting a "Project Overview and Plan for Initial Environmental Evaluation." In

this document the company described their economic opportunity and how they proposed to develop and operate it. Moreover, the company outlined their proposed program for environmental evaluation. This outline identified the environmental baseline studies and inventories needed, key socio-economic and environmental issues, and plans for public consultation.

The overview offered regulators, the general public and First Nations an opportunity to comment on the technical merits, completeness and adequacy of the project's proposed design and environmental studies before the proponent incurred significant costs. This began a co-operative cycle of proposal, review, comments, suggestions and improvements, which successively improved the project plans and facilitated its review and approval. On the basis of comments received on its overview, the company was able to proceed with assurance on its environmental studies and on the second stage of its engineering designs.

## Project Construction

The biggest hurdle faced by the proponents was public uneasiness about the possibility of cyanide leaking into the environment. Although heap leaching is designed to be a closed system, serious failures have occurred in Colorado where leaking pads released cyanide into watercourses. At Brewery Creek, the leach pad was built on sloping terrain partially underlain by permafrost. The mine area drains into the Klondike River, with productive fish and wildlife habitat, the municipality of Dawson City and farmland located downstream. Hence, local residents, First Nations, environmental regulators and other stakeholders were all concerned about potential adverse impacts resulting from any leakage or overflow from the Brewery Creek heap leach system.

Regulatory authorities had reason to be cautious as the proposed technology was new to Yukon and there were no established design standards



to follow. Furthermore, First Nations regarded mining as the industry that had previously devastated the Klondike River Valley environment, making outsiders rich and leaving local residents to live with the damage. Thus, they were skeptical of experts and their promises and they feared the consequences of design failure.

Proponents and project engineers were faced with the difficult challenge of presenting a technically convincing design. In the end, however, the final design set a new technical standard for Canada, one that most likely would not have emerged without the interactive review process that took place.

Although design changes resulted in greater initial construction costs, the Brewery Creek Mine faces a reduced likelihood, in the long term, of repair, remediation and liability as a result of system failure.

### Use and Operation

Operational concerns surrounding the Brewery Creek project fall into three categories:

- routine operations, maintenance and monitoring procedures;
- emergency procedures to detect, mitigate and repair failures in operating systems; and
- provisions for ongoing socio-economic benefits to local residents.

A close link exists between how socio-economic benefits are provided to and how environmental risks are perceived by local residents. Without adequate benefits, local residents have little reason to accept environmental risks. If, on the other hand, a community feels that benefits render a project attractive, residents will review operating and emergency procedures constructively and resolve problems.

In the Brewery Creek case, compensation agreements were reached with local trappers and a social and economic agreement was negotiated with First Nations.



*Brewery Creek Mine: operational phase.*

### Abandonment and Reclamation

Brewery Creek Mine is being progressively reclaimed as ore deposits are mined out. The first mining area (first open pit and waste rock storage area) has already been backfilled, regraded and partially revegetated. In addition, the company has submitted a "Decommissioning and Reclamation Plan" for public review that sets out procedures for reclamation of the mine once operations cease. The plan addresses the estimated cost and schedule of restoring the site to a degree consistent with its pre-development state. The plan also describes how this reclamation program will be funded and bonded. (A fund (bond) for reclamation is being accrued with every incremental tonne of ore placed onto the leach pad.) When the mine is ultimately abandoned, the productive capacity of the site will have been restored and the residents of the Klondike Valley will have benefited from the training and employment they received.

Mines may not be sustainable for the very long term, but their impacts can be minimized, sites restored, and benefits shared and invested within the region. Developments that meet these requirements are more likely to be welcomed in northern Canada.





*Former Brewery Creek Mine pit under reclamation.*

## Summary

Brewery Creek Mine is operating in compliance with its licences and in the spirit of the socio-economic agreement negotiated between the company and First Nations. By 1998, the company was nearly halfway toward meeting its goal of employing 50 percent of its work force from First Nations. It was offering training courses to residents and encouraging opportunities for local contractors and joint ventures.

Government, as well as industry, learned from the Brewery Creek review process. One challenge faced by government was how to review designs for new technologies. As DIAND did not have the in-house technical expertise to deal with this issue, it looked externally for a solution. Thus, yet another form of partnership was demonstrated in this review process.

Projects are more likely to be successful when all parties realize that there is a better way of doing business. That awareness is the first step toward achieving the full benefits of sustainable development.



